American
GAS JOURNAL
Formerly American Gas Light Journal
EST. 1859

VOL. 126. No. 7.
WHOLE NO. 2465.

NEW YORK, SATURDAY, FEBRUARY 16, 1924

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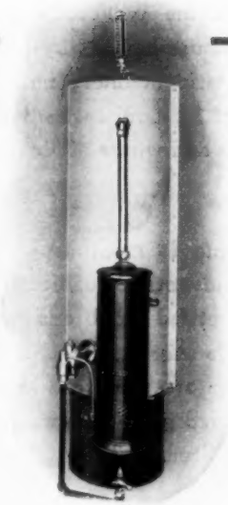

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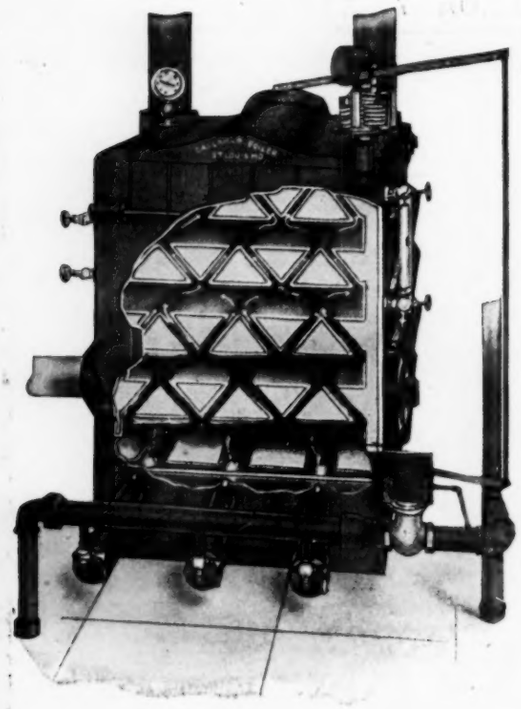

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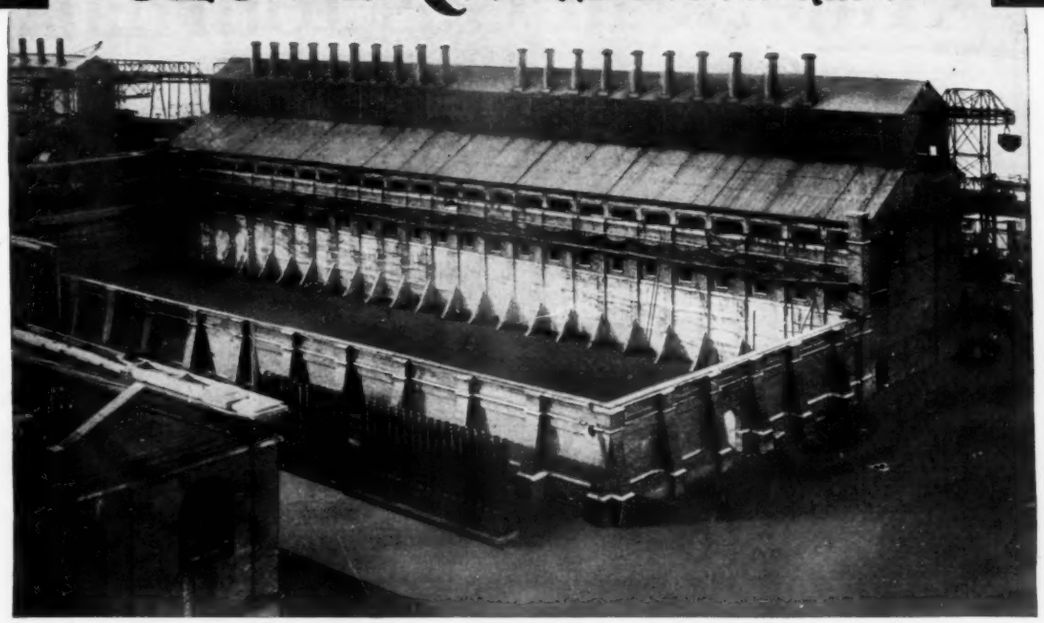

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American Gas Journal

SIXTY FIFTH YEAR

Published Weekly by American Gas Light Journal, Inc., 53 Park Place, New York, N. Y.

S. G. KRAKE, Pres. & Treas. C. S. MYERS, Vice-Pres. A. M. GLEASON, Sec'y.

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Subscription $3.00 per year, including postage, in the United States, Mexico, Cuba, Porto Rico, Hawaii or the Philippines; in Canada, $4.00; foreign, $5.00—Single Copies, 10 cents.

AMERICAN GAS JOURNAL, February 16, 1924. Vol. 120, No. 7. Published weekly by American Gas Light Journal, Inc., New York, N. Y. Entered as second-class matter Jan. 9, 1917, at the post-office at New York, N. Y., under the Act of March 3, 1879.

AMERICAN
GAS JOURNAL

Vol. 120. No. 7 NEW YORK, FEBRUARY 16, 1924 Whole No. 3449

Determining the "Combustion Power" of Coal

What this means and how it is done

Dr. Maurice Nicloux

THE combustive or burning power of illuminating gas is defined as the number of volumes of air which are required to accomplish the complete combustion of an unit volume of gas. It is, therefore, a ratio, a number without dimensions, in whose determination care must be taken to measure the volumes at the same temperature and the same pressure, making due allowance for the tension of water vapor.

This factor is of great importance to industrial gas men and designers of industrial apparatus, who must know the quantity of air, the supporter of combustion that is required to effect complete combustion of the ga.s This is important, for it is impossible to regulate the admission of air to the burners in the proper quantities unless this factor is accurately known. But in our opinion and particularly when the question of carbon dioxide and carbon monoxide production is taken into consideration, this factor is even of greater importance from the standpoint of hygiene.

Calculation According to Composition of Gas

If the exact composition of the illuminating gas is known, it is evident that the calculation leading to the determination of the combustive power of the gas will be very simple. Unfortunately this information is often lacking. Just to show how the calculation is made, two analyses of gas are given below in detailed form and the oxygen required to burn 100 volumes of the gas as well as the volume of carbon dioxide produced are included.

TABLE I.

Constituents of gas.	Parts per 100	Oxygen consumed	CO_2 produced
Oxygen	0.04	....	....
Carbon monoxide	5.66	2.83	5.66
Hydrogen	54.08	27.04	....
Nitrogen	3.47	....	....
Carbon dioxide	1.81	....	1.81
Methane	33.03	66.06	33.03
Ethane	0.75	2.62	1.50
Propane	0.12	0.60	0.36
Butane	0.014	0.09	0.056
Acetylene hydrocarbons.	0.096	0.24	0.192
Propylene & homologues	0.48	2.28	4.44
Ethylene	2.12	6.36	4.24
benzol vapor	1.00	7.50	6.00
Other vapors water, etc.	1.77	....	....
	100.00	106.74	49.85

TABLE II.

Oxygen	0.5	....	....
Carbon monoxide	8.33	4.17	8.35
Hydrogen	50.89	25.45	....
Nitrogen	0.87	....	....
Carbon dioxide	1.88	....	1.88
Methane	33.03	66.06	33.03
Propylene	1.29	6.12	3.87
Ethylene	2.00	6.00	4.00
Benzol vapor	1.19	8.93	7.14
	100.00	116.73	58.27

From these tables it is easy to deduce—as air contains 21 parts of oxygen per 100 and the quantities of oxygen consumed is respectively 106.7 and 116.7—that the volume of air required to burn 100 volumes of illuminating gas, which is the definition of combustive power, is 508 and 553, respectively. It will be remarked that the quantity of carbon dioxide produced in the burning of the gas is approximately half the volume of oxygen consumed.

Determination of the Combustive Power

The principle of the method used in determining the combustive power of a gas is as follows: If a certain quantity of illuminating gas is added to a definite volume of air, containing, therefore, a definite volume of oxygen, and if the addition is made in such a manner that the air is in excess so that eudio-

*Translated especially for the American Gas Journal from Chimie et Industrie.

metric combustion is assured, the oxygen is used up in part only. If then the residual oxygen is determined, the difference between the original quantity of the oxygen contained in the air, and the residual excess oxygen remaining after combustion, will give the quantity of oxygen consumed. From this it is easy to obtain the combustive power of the gas by means of a simple calculation.

Apparatus Used

The apparatus used in this method is very simple. A bulb, having a volume of 45 cubic centimeters, is connected at its lower end to a tube which is graduated into fifths of a cubic centimeter in such a way that the total volume amounts to 70 cubic centimeters. The analysis is started by introducing air through this tube. The quantity of air used is measured on a water trough at a constant temperature. This is obtained by the flow of a stream of water which enters the lower tubulated end of a large cylinder and flows off at the upper end. Then the illuminating gas is added, the difference between the two readings giving the volume of the gas. After this has been done the gas is led over a Grehant igniter, which consists of a platinum thread which can be brought up to a red heat. The mixture of air and gas can be detonated in this way and the volume of the gases of combustion is then noted.

The carbon dioxide, that is produced in this manner, can be absorbed in a potash solution and the reduction in volume which is caused thereby can also be determined. The oxygen in the gases of combustion can be absorbed by hydrosulphite of soda solution, which has been rendered alkaline by the addition of a solution of potash or soda. The reduction in volume is determined again, and the difference between the last two volumetric readings will give the proportion of oxygen in the gases of combustion. From this it is a simple matter to calculate the quantity of oxygen that has been consumed in the combustion of the gas.

All these measurements are carried out on a water trough. The reagents are introduced into the large bulb holding the gas-air mixture in small bulbs which may be closed with the finger, while being inserted under the water or else in tubes of small diameter. The bulb containing the air-gas mixture may be closed with a rubber stopper and shaken until the action of the reagent is complete. Then the mouth of the bulb is placed under water, the stopper is removed and, after the water rises in the bulb, the volume may be read off the graduated tubular part.

Sample Analyses

Two sample analyses are shown so that it may be clear just how the method is carried out in actual practice. One sample of gas was taken from the gas works in the city of Strasbourg and the other from the works in the city of Paris. The first sample of gas is freed from its content of carbon dioxide and gas, respectively 3.6 and 3 per cent, making a total of 6.6 per cent, by treatment with potash solution and hydrosulphite of soda. The volume of air used was 53.6 cubic centimeters, which contained 11.25 cubic centimeters of oxygen. The volume of gas and air was 64.5 cubic centimeters, making the volume of gas 10.9 cubic centimeters. After the explosion, the volume of the gases was 51.5 cubic centimeters, and after absorption with potash solution the volume was 47.2 cubic centimeters, which means that the carbon dioxide absorbed was 4.3 cubic centimeters. Then after treatment with alkaline sodium hydrosulphite, the volume was 45.4 cubic centimeters, which means that the proportion of oxygen that remained was 1.8 cubic centimeters. Subtracting this figure from the original oxygen present in the gas-air mixture, 11.25 cubic centimeters, there is obtained a consumption of 9.45 cubic centimeters of oygen. In other words, 9.45 cubic centimeters of oxygen were consumed in burning 10.9 cubic centimeters of illuminating gas. But as $10.9 \times 100 \div 93.4$ is equal to 11.67 cubic centimeters of the original gas before the oxygen and carbon dioxide contained in it were removed, the consumption of oxygen per 100 cubic centimeters of gas is 80.9 ($9.45 \times 100 \div 11.67$).

Analysis of Gas Made in Paris

In the case of the Parisian gas, it was found that it contained 2.32 per cent of carbon dioxide and 1.68 per cent of oxygen, making a total of 4 per cent. The volume of air was 57.9 cubic centimeters, that of air and gas 65.7 cubic centimeters, making 7.8 cubic centimeters of gas and 12.15 cubic centimeters of oxygen. After explosion, the volume was 54.6 cubic centimeters; after KOH absorption the volume was 51.25 cubic centimeters, giving a volume of 3.35 cubic centimeters of carbon dioxide in the products of combustion. After absorption in alkaline sodium hydrosulphite, the volume was reduced to 46.8 cubic centimeters, which indicated a residue of 4.45 cubic centimeters of oxygen. The oxygen consumed in the combustion was therefore 12.15 minus 4.45, or 7.70 cubic centimeters. Each 7.8 cubic centimeters of gas used represent 8.12 cubic centimeters of the original gas before the carbon dioxide and the oxygen were removed. Thus, for every 100 cubic centimeters of the gas burnt there were consumed 94.9 cubic centimeters of oxygen.

From these figures a simple calculation gives the combustive power of the Strasbourg gas as 385 and that of the Paris gas as 452. Another simple calculation shows that for every 100 volumes of Strasbourg gas burnt there will be produced 36.8 volumes of carbon dioxide, and for every 100 volumes of Paris gas 41.2 volumes of carbon dioxide.

Determination of Nitrogen

The figures which have just been described differ very considerably from those calculated from the percentage composition of the gas, as given in the tables in the beginning of this article. The reason for this disagreement must be looked for in the more

or less great proportion of nitrogen, which is found in the gas.

From the gas analyses given below, it will be seen that the gas in the first table contains 3.47 per cent nitrogen, while that in table II contains only 0.87 per cent nitrogen. The first figure is quite high and seems to indicate a leakage of air into the gas mains, while the second figure is very low.

When the combustive power of gas is determined by means of the apparatus whose manipulation has been described above, it is possible to ascertain the percentage of nitrogen in the gas without any special manipulation. In fact, when the gas is burnt with an excess of air, the products of combustion are water vapor and carbon dioxide. The water vapor disappears and the carbon dioxide is absorbed during the course of the analysis. All that remains in the combustion bulb is a mixture of nitrogen and oxygen. The latter is in turn absorbed by alkaline sodium hydrosulphite and only nitrogen remains behind. This nitrogen is derived from two sources, namely, from the air and from the gas itself, that is, the inherent nitrogen contained in the illuminating gas. As it is a simple matter to determine the quantity of nitrogen that is derived from the air that is used in the combustion of the gas, when this figure is subtracted from the total nitrogen, the residual nitrogen represents that contained in the illuminating gas itself.

Application of Method to Analysis of Actual Gas Samples

When this method of calculation was applied to the two samples of gas, the details of whose analysis has been described above, the following results were obtained. It was found in the case of the Strasbourg gas that the volume of gas that remained in the bulb after the oxygen and carbon dioxide had been removed by absorption was 45.4 cubic centimeters. The original volume of air used was 53.6 cubic centimeters, which meant that the nitrogen in this air was 42.35 cubic centimeters, or 79 per cent. The nitrogen that was present in the original gas was, therefore, 45.4 minus 42.35, or 3.05 cubic centimeters. This, then, means that in the 11.67 cubic centimeters of gas there were 3.05 cubic centimeters of nitrogen, or 26.2 parts in 100 parts of the gas.

In the case of the gas manufactured in Paris, the volume of gas remaining, after the carbon dioxide and oxygen had been absorbed, was 46.8 cubic centimeters. The original quantity of air used was 57.9 cubic centimeters, which corresponds to a nitrogen content of 45.75 cubic centimeters. This left 1.05 cubic centimeters of nitrogen in 8.12 cubic centimeters of the original gas, or 12.9 per cent.

Results Obtained Were High

Various other analyses were made of the Strasbourg gas and the results obtained for nitrogen was 31.6, 30.9, 26.2, 24.9, 23.5 and 23.5. All these figures are very high and it at once suggested itself that air leaked into the apparatus during the analytical process. Considering the fact that various reagents were used in making the analyses and that the bulb containing the gases of combustion was constantly handled during the analyses, it is easy to see that it might be possible that a few tenths of a cubic centimeter of air could get into the apparatus which would give rise to quite an appreciable error in the results, due to the fact that only a small amount of the gas is used in the analysis. Another method of analysis was therefore used as a check against the results obtained in this way.

The Copper Oxide Method

When air is passed over copper oxide, heated to a red heat, the oxygen is caused to combine with the copper oxide and the nitrogen is recovered and can be measured. This method was used by the author with certain refinements required in making a micro-analysis. A micro-nitrometer is used in the analysis. From two to two and one-half cubic centimeters of gas are a sufficient sample.

The technique of the method is very simple. Just as in regular analysis, it consists in causing combustion to take place in the presence of oxide of copper in a current of carbon dioxide. A quartz tube, 11 millimeters in diameter and 40 centimeters long, was used by the author in the experiments. The oxide of copper in the tube was heated over a length of 30 centimeters. The only real difficulty that arose in the analysis was in the superposition of a current of illuminating gas on the continuous stream of carbon dioxide gas, coming from a Kipp generator, passing through the oxide of copper tube and finally entering the micro-nitrometer.

Technical Details of the Method

A glass tube, shaped in the form of a T, is placed above a quartz tube. The two horizontal branches of the T tube serve to connect it with the quartz tube on the one hand and with the Kipp generator through a differential valve on the other hand. The vertical branch of the T tube, which may be regarded as the lower branch of the tube, is furnished with a glass stopcock and its end is rounded off and polished. This end fits into a tube which terminates in a small bulb of about six to seven cubic centimeters capacity furnished with a stopcock. The manipulation of the apparatus is very simple.

The quartz tube, which contains the copper oxide, is placed in the furnace. This is lighted and a current of carbon dioxide gas is passed through the entire apparatus, particularly through the horizontal branch of the T tube, which has been filled in advance with water in its vertical part, the part located below the valve. Microscopic bubbles are thus allowed to escape into the nitrometer. At that moment the small bulb, referred to above, which contains the exact quantity of gas that is going to be analyzed, is connected with the vertical branch of the T tube and tightly fastened to it by means of a rubber cork in which there is inserted a small tube which is connected with a small tubulated bottle filled with water.

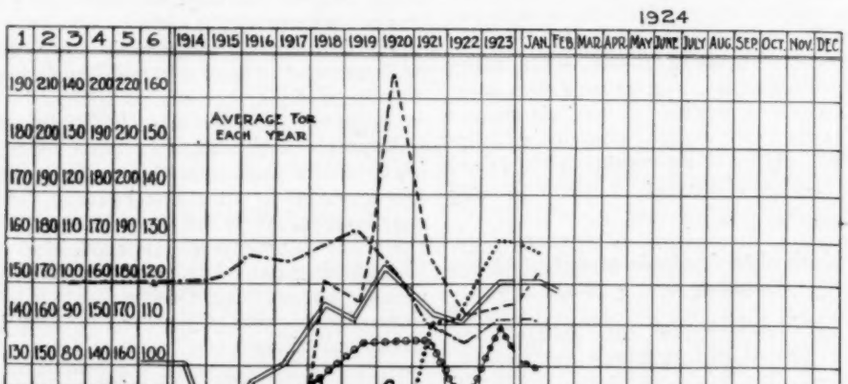
(Continued on page 151)

Better Business Ahead

Increase in Nation's Industrial Equipment and Multiplication of Industrial Enterprises Cautioned Against

L. W. Alwyn-Schmidt

THE slight improvement noticed during December did not continue during January, but it will most likely reappear more strongly during February and March. The reason for the present quietness is probably that only a few of the nation's industries have until now felt the influence of the new buying movement, while others are still running below the level of the second half of 1923. Economic improvement does not come at once in all industries. Experience, in fact, shows that every new buying movement appears first in such fields that happen to be especially susceptible to the influx of new buyers. Hence, the industry which happens to be in its so-called season will invariably be the first to notice signs of improvement. The strength of the buying movement extends later to other industries, as their buying season comes around. According to this rule—and it seldom fails—the agricultural implement industry, the clothing industry, the cotton industry and the electrical equipment industry, should be next in line for an increase in business.


1924
1 2 3 4 5 6
1914 1915 1916 1917 1918 1919 1920 1921 1922 1923
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEP. OCT. NOV. DEC.
AVERAGE FOR EACH YEAR
1) Actual Industrial Activity
2) Manufacturing Cost
3) Margin of Profit
4) Indicated Purchasing Power
5) General Business Activity
6) Indicated Development of Market

Caution Is Called For

Manufacturers should cautiously approach any increase in volume of orders. The forecasting line of our chart indicates a nervous market, and readers will be well advised to remember that the new forward movement, if it materializes, will be built upon a market which, while thoroughly healthy in structure, has run on rather high figures in the past. Under such circumstances the volume of purchases must be very considerable indeed in order to produce a marked effect upon the total turnover of merchandise. It would have to be exceptionally large to justify an increase in the nation's industrial equipment or a multiplication of enterprises. Careless expansion of this kind was principally responsible for the industrial debacle after the war. There is no reason for going through this experience, especially as it has proved to be so disastrous to our industrial life only a short time ago.

Thanks to the quick action of the banks, industrial inflation was stopped early last year by a strict censure of all industrial credits. It is to be hoped that similar action will not be required during the present year.

Accumulation of Stocks Being Corrected

While expansion and multiplication cannot be sufficiently discouraged, there is, on the other hand, reason to advise manufacturers to keep themselves

(Continued on page 142)

INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT — YOU CAN DO IT BETTER WITH GAS

Lesson No. 7

The Mercury Thermometer and the Degree Fahrenheit

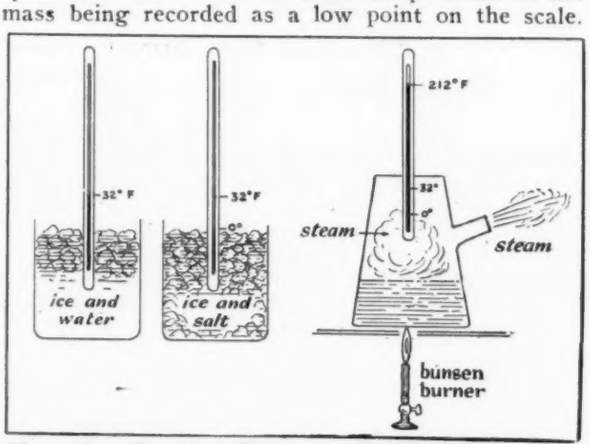
The Mercury Thermometer.

The instrument that is most commonly used to measure temperature is the mercury thermometer. The popularity of the mercury thermometer is due to the properties of the liquid, metallic mercury. This substance stays in the liquid condition through a wide range of temperature, from a minimum of approximately 38 degrees below the zero point on the centigrade scale, whereat it freezes to a solid to 357 degrees above the zero mark, whereat it is converted into a vapor. It thus covers the range of temperature encountered in ordinary life and common operations. Of course, where the temperature goes below the freezing point of mercury, as it does in certain very cold climates, another liquid must be used in the place of it. Alcohol is then generally employed. Then, again, when the temperature rises above the boiling point of mercury, other means must be used for measuring the temperature.

The mercury thermometer is of such well known construction that it does not require detailed description here. The mercury is contained in a glass bulb which is an enlarged portion of the capillary stem of the thermometer. The stem of the thermometer is closed at the end so that there is a vacuum above the mercury. In certain cases the space above the mercury is filled with an inert gas such as nitrogen to prevent the evaporation of the metal at high temperatures. A nitrogen-filled thermometer can be employed at temperatures higher than the regular form of mercury thermometer.

The Fahrenheit Scale.

The Fahrenheit scale of temperature measurement is used in this country and in England. It was the first temperature scale devised. It must be remembered that all temperature scales are somewhat arbitrary—but not entirely so—for they are based on the changes that heat causes in pure water. In other words, the most important points on the temperature scale, the basic limiting low and high temperatures, are the freezing point and the boiling point of water. The Fahrenheit scale was devised by the inventor and scientist, Fahrenheit, who lived in the city of Dantzig when he devised the Fahrenheit temperature scale The story goes on to say that this scientist was extremely anxious of making an instrument that would tell the real truth about the temperature of a body. He knew that the temperature during winter in his city went down far below the freezing point of water, for Dantzig is very cold during the winter season. Hence in selecting a scale he did not begin with the freezing point of water, but at a point below the same, which he thought was the maximum cold that could be produced. He obtained this by the use of a mixture of ice and salt, the cracked ice being sprinkled with the salt and the temperature of the mass being recorded as a low point on the scale.



How the Freezing Point and Boiling Point Temperature of Water Are Fixed on the Fahrenheit Scale

By working in this way he reached the conclusion that the freezing point of water was 32 degrees Fahrenheit, but while his determination of this point was carried out with some degree of scientific skill, nevertheless, this temperature, 32 degrees, was and still is an arbitrary limit.

The Boiling Point of Water, the Upper Limit.

This was the first limit determined. Then the upper limit was found by recording the temperature of boiling water, that is, water being at such temperature that the continued application of heat no longer raises the temperature, but converts the water into steam. The height of the mercury column in the tube was noted. By calculating the expansion that took place in the mercury, due to the application of

this amount of heat, the point 212 degrees was arrived at as the boiling point of water. The difference between 32 and 212, or 180 degrees, was divided into equal parts, and each of these parts was termed a degree. This is the Fahrenheit scale. The stem of the thermometer above 212 degrees and below 32 is of course divided into equal parts, using the degree Fahrenheit as the unit of division.

The Degree Fahrenheit

Thus the Fahrenheit temperature scale is an arbitrary scale to a certain degree. It is based on the change brought about in the liquid water due to the addition and the subtraction of heat. Other temperature scales are also based on the same phenomena. It is now clear that when a degree Fahrenheit is talked of, what is meant is the one hundred and eightieth part of the distance between the height to which mercury will rise in the thermometer stem at the boiling point of water and the depth to which it will sink at the freezing point of water, or rather the melting point of ice. The determination of these points must take place at atmospheric pressure, for the pressure at which a liquid is made to boil or a solid is made to melt has an effect on the temperatures at which these two phenomena will take place.

BETTER BUSINESS AHEAD

(Continued from page 140)

ready for a 100 per cent utilization of their present equipment. True, we are passing through a season of slackness following a short period of overproduction in October and November, when the flattening-out tendency of the market was not yet fully realized by all manufacturers. But the accumulation of stocks, caused thereby, will correct itself automatically, and we may expect an opening of the channels of distribution at an early date. The correctness of this statement is borne out by the fact that merchants who kept their stocks low during the Christmas season are now placing orders freely.

Nervous Condition of Market Merely Transitory

There are two reasons which lead one to expect that the present nervousness of the market will be of a passing character only. One is the still very high purchasing power of the nation as a whole; the other is the more specific news that the farming community was not severely affected by the rural depression as had originally been expected. The principal problem in consequence seems to be to determine when we may expect the approach of the new buying movement. Winter is very late this year and there are some who now predict a late spring. This would put seeding time later in the year than usual and might in this way defer the return of the farmer in the market. As the farmer's buying always releases a large amount of ready cash, this delay might prove rather inconvenient to our manufacturers, as it may cause difficulties in realizing on spring sales. How can this situation be taken care of by an intelligent handling of the credit situation? There has in former years been a tendency to induce retail buying by a system of extended credits. While such a practice will work well in an active market, it may, however, easily lead to embarrassment when the market enters a downward grade. In such a case it overloads the retailer with merchandise upon which he cannot realize, not only maying payments difficult, but clogging up at the same time the manufacturer's channels of distribution. The better way out of such a situation as the present is to encourage numerous small sales over a widely diversified field, permitting in this manner a rapid turnover of cash and merchandise. This in turn means short credits and encouragement to take the discount.

The February Chart

In presenting this month's report and chart, the reader's attention is drawn to the slight change made in the system of recording. This has been done for the purpose of bringing the various lines in the same relation to each other, each moving upon the same scale of 10 degrees to each horizontal line. For convenience's sake the former system of giving to each line its own scale has been retained. The hundred-point has been placed in each instance so as to bring the full line inside the recording field of the chart. The continuity of each line has been broken on the double vertical line separating the yearly averages from the monthly record of the new year 1924. These changes have been made at the suggestion of several readers.

As The Journal Views It

THE COMING ANNUAL CONVENTION

The American Gas Association gives first official notice that its Sixth Annual Convention will be held on the Steel Pier, Atlantic City, N. J., October 13-17, 1924.

Thus the day when gas men will gather from all parts of the country to meet once again for social, educational and business intercourse in the Queen City of the Shore is fixed. All eyes will now be directed towards that day and all efforts strained to make the coming convention bigger and better than ever.

It is by no means too early to start the work. This is the time to make the preparations. Each and every gas man in the country should at once resolve to commence doing his bit towards making the coming convention a success. There is no time like the present for beginning the long pull that will eventually come to a triumphant conclusion in October.

Let every gas man from now on talk the 1924 Convention! Let every man keep it uppermost in his thoughts and lend every effort to make it the best ever held! This is a work, an undertaking that is explicitly mutual in its benefits. It is for the good of all, of the entire industry. It is up to every man, every member of the industry, every enterprise directly or indirectly connected with it to work for success in the 1924 Convention, a success that should and must continue to be surpassingly greater from year to year.

ASPHYXIATION WITH GAS

Ever since gas was first used as a fuel for heating and lighting purposes, careless individuals, or those who deliberately courted destruction, have been asphyxiated by gas under one circumstance or another. One of the main objections raised by stand-patters who refused to use gas in place of other fuels at the beginning of the gas industry was that gas was poisonous and therefore should not be used or brought into homes or houses.

To the thinking individual the arguments against gas on this ground, which, in a certain sense, have even persisted to this day, are silly and scarcely worth bothering about. It would be just as foolish to say that we ought not to have automobiles because so many people are killed by motor cars in crossing the streets.

There is no question but that the greatest care should be taken in the construction and maintenance of gas appliances in homes and industrial establishments, so that the escape of gas is impossible, except through the carelessness of the user—and from this there is absolutely no way of escaping. It is just as impossible to guard against the careless use of gas as it is against jay walking across streets crowded with traffic, or the disregard of danger signs at grade crossings on railroads.

There will always be people who will do foolish things and who will come to grief as a result of their doings. There will always be people who will be asphyxiated by gas through carelessness, and there is nothing that the gas company could do that could prevent such happenings.

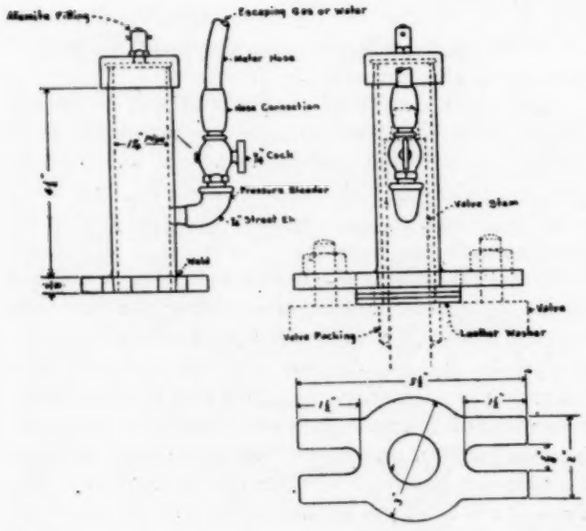
The fact that there has been a considerable number of deaths due to asphyxiation during the past few months in the City of New York was seized upon as reason for the introduction of a resolution in the Assembly at Albany, to the effect that a Commission be appointed to investigate as "speedily as possible" into the quality, service and pressure of gas used for illuminating, heating and other similar types, and the state of repair of gas appliances and fixtures used for such purposes, and the contention that such gas and gas appliances and fixtures constitute a menace to the safety and health of persons using the same."

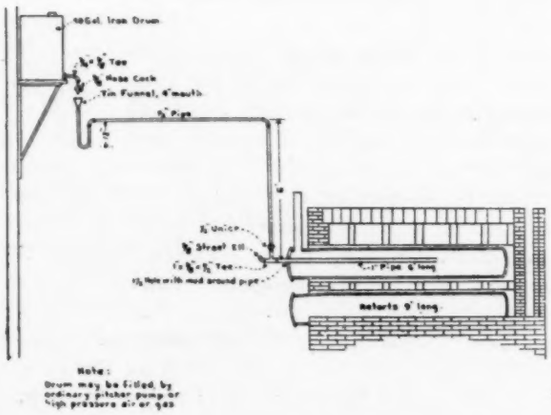
Here again is an illustration of the state government making preparations to investigate and probably exert a certain amount of interference in the business of the gas company. Investigation may be advisable and it may bring out results that may be beneficial to the gas company. It will undoubtedly find that gas appliances, as a whole, are kept in good condition, and that the asphyxiation of persons from gas is not due to faults in the gas appliances, but to the fact that people are still inclined to blow out the gas light instead of putting it out by shutting off the supply of gas and that some users of gas do not exercise the proper care in using it.

Then, again, it must be remembered that there is a certain amount of danger from burning gas in appliances in unventilated rooms where the gas appliance itself is not provided with a flue, so that the products of combustion are not removed from the room. The users of gas should always have such an arrangement where it is possible, and where it is not possible, he should see to it that the room is ventilated. The latter course is probably the simpler of the two expedients, for it is a very easy matter to have the window open in a room, and; furthermore, the fresh air entering will unquestionably be beneficial to the occupants of the home.

It is unfortunate from certain considerations that legislative investigation is contemplated in this matter, for, as is well known, the very fact that such a resolution, as mentioned above, was introduced into the Assembly, will give a number of people the idea that there is something wrong and that the gas company is again an aggressor and is not looking after the interests of its customers. That is the real injury that this investigation will cause, for even if the conclusions vindicate the gas company, a certain impression will have been created in certain minds that there was something wrong or else there would not have been an investigation.

GAS WRINKLES





A stream of oil about the size of a match at the funnel opening, combined with an air mixture entering a ⅜-inch ell at the bench, seems to give the best results. If air is not admitted the pipe will clog.

COAL GAS OIL BOOSTER

R. J. Jenks, Portland, Oregon

This booster consists of a 50-gallon oil drum used as a supply reservoir for kerosene oil. This oil is fed by means of a drip system using a half-inch supply pipe line into the bench, where it is used as an enricher.

This coal gas oil booster is to be used purely in times of stress, when demands come that the equipment cannot meet. As much as 80,000 cubic feet a day, for two days, was made on one bench of sixes by means of this device.

REGULATOR HOLDER

Thomas E. Boyd, Denver, Colorado

A very simple device is used for holding regulators while tearing down or assembling. It consists of a threaded piece of ¾ in. pipe extending about 1 in. above the work bench and clamped tight. The regulators are quickly screwed on to this pipe, which holds them rigidly in place. This enables the workmen to use both hands and prevents injury often caused by regulators slipping. Any play in the parts of the regulator is at once apparent. All parts may be made tight and a great saving in time and accuracy of adjustment is accomplished.

Catechism of Central Station Gas Engineering in the United States

Installment No. 7

(Continued from last week)

The charging opening, through which the furnace is filled with fuel, is in front at the level of the charging floor for the retorts, the brick work of the front wall of the furnace being stepped out gradually until it projects enough to permit the opening to be entirely in front of the front wall of the setting, and in such a position that the coke from the middle retorts of a bench of 9s, or the top retorts of a bench of 6s, can be drawn directly into the furnace. This charging opening is closed by a loose cast-iron lid fitting into a groove in a cast iron frame so as to make an air-tight joint with the aid of a little coke dust which is allowed to collect in the groove.

The primary air is drawn in through two flues, A, A, one on each side of the furnace. The fronts of these flues are closed by air ports with sides by which the area of the opening and therefore the amount of primary air can be closely regulated. From these flues the air passes to the recuperators if the setting is recuperative, or direct to the furnace if the setting is not recuperative. In either case it enters the furnace through a number of openings, B, B, B, B, in the side walls directly under the grate bars, the object being to have it distributed as much as possible over the full depth of the grate.

Admission of Secondary Air

The secondary air is admitted through air ports, similar to those for the primary air, in two flues, C, C, one on each side of the furnace, and passes through the recuperators, when these are provided, or simply through flues running to the back of the setting and forward again. In either case it is taken off from the last longitudinal flue in the series, by short transverse flues, D, D, D, D, each of which opens directly in front of one of the nostrils through which the producer gas passes from the generator to the setting. Each stream of gas is thus supplied with a stream of secondary air for its combustion. There are usually five of these openings on each side of the combustion chamber, as that part of the setting in which is begun the combustion of the gas is called, spaced equal distances apart from the front to the back of the setting.

Cleaning the Fire

To clean the fire, the water is shut off from the step grate, the cleaning door opened, secondary bars driven in above the top plate of the step grate until their points are supported by the sloping back wall of the furnace, the regular bars removed and the ashes allowed to drop into the ash pan, the grate bars replaced, the clinker cut away from the walls and removed, the secondary bars pulled out, dropping the fire on to the grate, the water turned on the step grate, the ashes removed from the ash pan, the primary air openings cleaned out, and the cleaning door closed to stay closed until the fire has to be cleaned again. If the coal contains only a normal amount of ash and the proper amount of water is supplied to the furnace, the cleaning need not be done oftener than once in 48 hours.

All generator furnaces are not built exactly as shown in the cuts, but every such furnace should have a closed top, and the arrangement of primary and secondary air flues and openings and of filling and cleaning doors will be substantially as is here illustrated and described.

Setting of Six Retorts and Recuperators

34. Give a description, illustrated with sketches, showing a vertical cross section, a vertical longitudinal section and a horizontal longitudinal section, showing the nostrils in the furnace arch, the secondary air openings into the combustion chamber, and the openings through which the hot waste gases pass into the recuperators, of a setting of six retorts heated by a generator furnace and equipped with recuperators. Neither furnace nor recuperators need be illustrated except to the extent required to show the above mentioned openings.

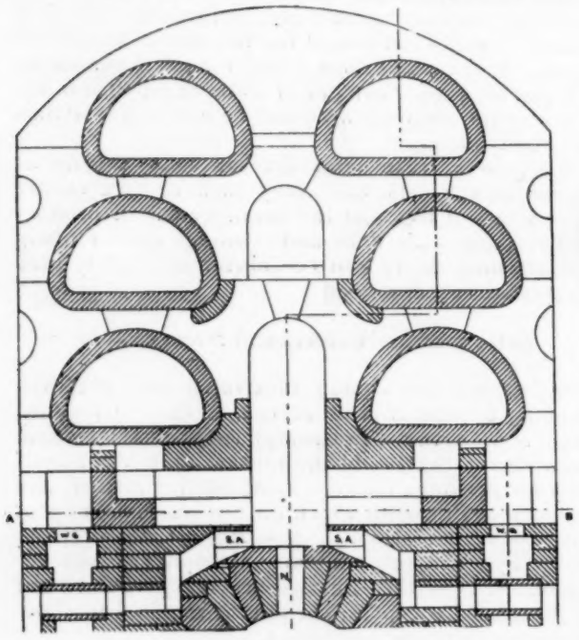
Ans. The recuperative setting of six retorts, which is illustrated by the accompanying sections, is designed to be built in an arch 8 ft. 4 in. wide and to contain retorts, the inside measurements of which are 15 in. × 26 in. × 9 ft. 0 in.

As will be seen from the cross section, the combustion chamber is made wide and high, being 14 in. wide and 3 ft. 6 in. from the top of the furnace arch to the bottom of the first arch of the setting which crosses the combustion chamber. The producer gas enters this chamber by five openings, or nostrils, marked N, spaced equal distances apart from front to back along the center line of the bench. The secondary air is admitted through the openings marked S. A. There are five of these on each side of the combustion chamber, level with the top of the furnace arch, each nostril having a secondary air opening opposite it on each side, so that two streams of secondary air are directed against each stream of producer gas.

Construction of Setting

The setting is built in one single chamber, the combustion taking place and the hot gases passing up

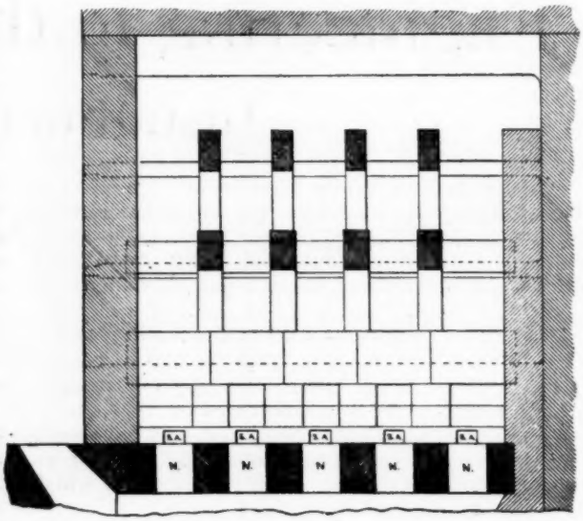
around the retorts along the full depth of the bench. To secure effective heating of the bottom of the bottom retorts, small passages, which lead out of comparatively large openings left under the bottom retorts, as shown on the sections, carry some of the hot gases directly from the lower part of the combustion chamber to the outside flues. The bulk of the products of the secondary combustion, however, pass upward and around the retorts, a portion passing out between the top of the bottom retort and the bottom of the middle retort, another portion passing out between the middle retort and the top retort, and the remainder going to the top of the setting and passing over the top of the top retort on each side. In whatever way the gases reach the space between the retorts and the outside walls on each side, they are drawn through this space to the bottom of the setting and pass down into the recuperators through five openings. These openings, marked W. G. on the sections, are spaced, like the nostril openings, equal distances apart from front to back of the bench, and by them an even distribution of the waste gases through the whole depth of the recuperators is secured.



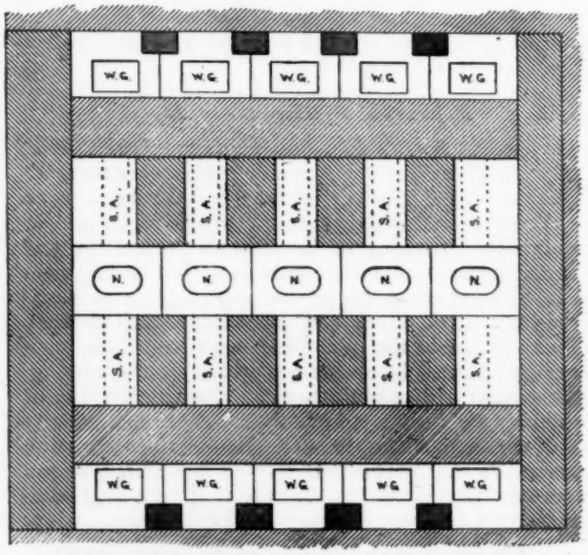
Bench of Six Retorts, Recuperative Setting
(Vertical Cross Section)

Setting Is of Skeleton Structure

The setting is a skeleton one, no more bricks and blocks being used than are necessary to support the retorts and prevent the heat from passing out the front of the bench. For the latter purpose the front wall is made 13 in. thick. The retorts are supported at the front by this front wall, at the back by a wall 9 in. thick, and at four points between these walls by blocks made of the proper shape to fit the outside of the retorts and form supporting arches, which carry the retorts and relieve the lower ones of the weight of those above them. The blocks supporting the inside lower corners of bottom retorts are made continuous for the whole length of the retorts so as to protect them from the great heat existing in this part of the setting and from the cutting action of the flame, and shield tiles are also provided for the inside lower corner of the middle retorts for the same object. At all other points the retorts are exposed to



Bench of Six Retorts, Recuperative Setting
(Vertical Longitudinal Section)



Bench of Six Retorts, Recuperative Setting
B(Horizontal Longitudinal Section Along Line AB on the Vertical Cross Section)

full contact with the products of combustion except where they are built in the front and back walls, or where they rest upon and are covered by the narrow supporting blocks. Since these blocks are only 5 in. or 6 in. wide it will be seen that much of the largest portion of the surface of the retorts is exposed to the direct action of the heat.

The blocks and bricks forming the walls of the combustion chamber should be made of extra quality material in order to stand the heat to which they are exposed. The blocks above the top of the bottom retorts on the inside of these retorts and all the blocks on the outside of the retorts may be made of any good first quality material.

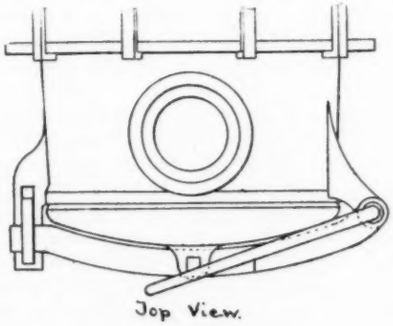
The Retort Mouthpiece

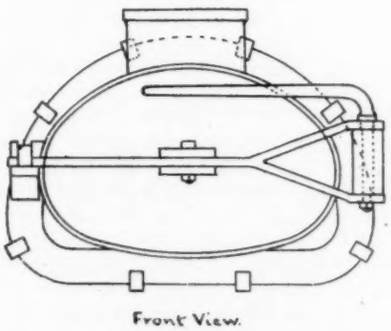
35. Give a description, illustrated with sketches, of a retort mouthpiece, showing the manner in which it is fastened to the front of the retort and the arrangement for making a gas-tight joint between the mouthpiece and the lid.

Ans. Retort mouthpieces are invariably made of cast iron, and such a mouthpiece may be described as being a tube of suitable cross section provided at one end with a flange of the size and shape of the front end of the retort and at the other with a faced lip, the cross section of the mouthpiece at this face being either round or more generally elliptical, no matter what the shape of the retort. The lugs required for supporting the lid and its fastening are cast on the sides of the mouthpiece, projecting beyond its faced edge, and an opening to allow the gas to escape from the mouthpiece is made at the proper place in the sides, at which place is also provided a bell to receive th lower end of the standpipe. The distance from face to face of flange and lip varies from 14 in. to 16 in., the shape and dimensions of the flange and the opening at the back should be the same as those of the retort, and the width and height of the front opening should also be the same as the corresponding dimensions of the retort, although the shape is, as stated, usually elliptical even with D shape retorts.

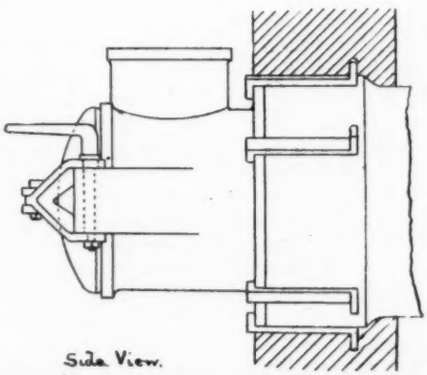
How the Retort Mouthpiece Is Fastened to the Retort

The mouthpiece is often fastened to the retort by means of ⅞ in. bolts about 9 in. long, inserted in holes, parallel to the axis of the retort, made in that portion of the retort wall, at the front end, which is thickened for the purpose. Each of these holes opens at its inner end into a square recess extending in from the outside of the retort. A square nut is put in this recess, and the bolt, which is threaded at each end, is inserted in the hole and screwed into the nut. The spaces left in the holes around the bolts are then filled with iron cement, made of one part by volume of fine iron borings or filings and two parts of fire clay moistened with a solution of sal ammoniac, the front of the retort is plastered with a layer of the same cement and the mouthpiece is put on and drawn up tight by screwing down the nuts put on the bolts. The faces of both retort and mouthpiece should be wet before the joint is made. A great objection to this method of fastening mouthpieces to retorts is that as the bolts burn out after the retorts have been in use for some time, the mouthpieces become loose and it is impossible to keep the joints between them and the retorts tight. It is also impossible to replace a broken mouthpiece by another in case of necessity. To avoid these faults clamps built into the front wall





MOUTHPIECE WITH SELF-SEALING LID, PROVIDED WITH ECCENTRIC LEVER FASTENING, AND CLAMPED TO RETORT.



of the bench are often used either in conjunction with the bolts or to replace them. Some of these clamps are provided with set screws which screw down on the front of the mouthpiece flange, while others are merely bent over against this front. In any case it is advisable to have the mouthpiece flanges set into the front wall of the bench, the faces of flanges and brickwork being flush with each other. When this is done the brickwork affords a good support to the mouthpieces apart from the fastenings, while no injury is done the flanges.

The Joint Between the Mouthpiece and the Lid

The joint between mouthpiece and lid was formerly made by means of a clay luting, but in recent practice by facing the front of the mouthpiece as described above and making the lid with a V shaped edge, which is also faced, the lids are made self-sealing. The lid is pressed against the face of the mouthpiece either by a cotter bar and screw or by a cotter bar with an eccentric lever handle. The latter form is the one most frequently used. When it is employed, the lid is provided with two lugs cast on it with their vertical center lines coinciding with that of the lid and one above and one below the horizontal center line of the lid with sufficient space between them to take the cotter bar to which it (the lid) is fastened by a pin passing through both lugs and the bar. On one side of this fastening the cotter bar branches into two parts with flat circular ends which fit on either side of a lug cast on the mouthpiece. Through this lug and the two parts of the cotter bar passes a pin by which the lid is fastened to the mouthpiece. This pin is turned and the openings in the cotter bar and lug are bored to make the pin a snug fit. The portions of the pin passing through the two parts of the cotter bar are turned to a common center, but that passing through the lug is turned eccentric to the others. A lever handle is welded to the pin, and by this handle the pin can be revolved in the lug and cotter bar. The other end of the cotter bar is single and is caught and held, when the lid is shut, by a hook fastened to a lug on the opposite side of the mouthpiece from the hinge lug. This end being held fast, the eccentricity of the different portions of the hinge pin causes the cotter bar to be thrown toward the face of the mouthpiece, when the pin is turned in the proper direction, and thus presses the lid against the mouthpiece with sufficient force to make the joint gas-tight. The center pin which passes through the lugs on the lid and through the cotter bar is also made eccentric and thus furnishes an adjustment by which the pressure produced by the action of the main eccentric can be regulated.

Design of Standpipes, Bridge Pipes and Dip Pipes

36. What points are to be provided for in designing the standpipes, bridge pipes and dip pipes for a bench of coal gas retorts?

Ans. The most important thing to be provided for in designing the stand pipes, bridge pipes and dip pipes for a bench of coal gas retorts is that they shall be made so that every point in each of them can be reached with a cleaning tool having a diameter not more than ½ in. smaller than that of the pipe. To enable this to be done the bent pipes must be made with very gradual curves and without any abrupt changes of direction and the dip pipes should be made perfectly straight from the cleaning opening on top to the lower end dipping under the water in the hydraulic main. If abrupt curves are used, it will be impossible to keep the pipes clear and free from stoppages.

It is also well to keep the number of joints down to a minimum, as the breaks in the surface at joints afford an opportunity for the building up of obstructions.

If the above points are observed, the necessity of having the pipes of large diameter is not as great as it is sometimes thought to be, pipes 7 in. in diameter being amply large for retorts carbonizing 350 pounds of coal in four hours.

It is understood to be a matter of course that the pipes will be provided with flanged joints, at such places as to enable them to be easily removed and replaced when necessary, and with proper cleaning openings, while the question of whether cast iron or wrought iron is to be used for the standpipes is such an open one that it will not be taken up here.

Layout of Bench for Six Retorts

37. Give a drawing showing, by a section through the center lines of the bent pipes, the layout for the bells on the mouthpieces and for the bent pipes for a bench containing six retorts, of the cross section given on the cut accompanying the answer to question No. 28, set in two vertical rows of three each, the center of the retorts in each row being 2 ft. 2 in. from the center line of the bench and 2 ft. 0 in. apart vertically. The pipes are to be 7 in. in diameter. The hydraulic main is 9 ft. 6 in. long over all and has a 3 in. angle iron at each end, the space between these angles being 9 ft. 0 in. The drawing must be fully dimensioned. Give also a written explanation of your reasons for adopting the design shown.

Ans. One of several possible ways of making the bells on the mouthpieces and for the bent pipes for a bench of six retorts described in the question, is shown on the cut. The mouthpieces are designed to be the full size of the retort all through, this being very necessary for retorts that are to be drawn by machinery. The balls are made large so as to leave plenty of room for the joints around the spigot ends of the bent pipes, it being difficult to make these joints tight when the space left for them is too small. The curved portions of the bent pipes themselves are made with as large a radius as it is possible to have on the two which pass up in the space between the top mouthpieces. This radius being sufficiently large to give a good sweep, has also been adopted for the pipes passing outside of the top mouthpieces in order to have all the bends the same, and so save pattern work, even though here a longer radius could have been used.

(Eighth Installment Next Week)

GAS MERCHANDISING

Domestic – Industrial

Washington's Birthday Appeal in Gas Appliance Displays

A Few Suggestions That Are Timely

Ernest A. Dench

On the surface, of course, it seems sacrilegious to commercialize a patriotic event. More so, too, when it is the birthday of the Father of Our Country, as in this particular case.

Personally speaking, we see no harm at all arising from this so-called commercialism, when good taste is manifested. Anything of a flippant nature should be conspicuous by its absence, for Washington's Birthday is an event to be respected.

So long as newspapers and magazines around the latter part of February carry articles throwing new light on George Washington, we are confident that commercialism is not sacrilegious. Newspapers and magazines are in business to make money—and so are gas companies.

Anyway, a birthday is a joyous event, not something sad like a death, and it is quite fitting and proper for a gas company to arise to the occasion with an appropriate window display or two.

It also affords the gas company plenty of scope to compare the heating, lighting and cooking methods of Colonial times with those of today.

Timely Events Break the Monotony of the Year

Parading the old familiar arguments is rather tiresome to the display manager and advertising director. A timely event like Washington's Birthday gives the creative side of a public service company ample opportunity to trot forth the well-worn line of reasoning in a new dress. Were it not for timely events to break the monotony of the year, display managers would soon grow stale, which would be reflected in their work.

No matter how versatile, a display manager will come to the time when he runs short of ideas. Those who have the time, travel around and visit other cities in search of them. Window displays are not copyrighted; so they are common property. If the display manager feels a little guilty about "bagging" someone else's clever ideas, he generally strives to change them around and perhaps improve on the original efforts. As a matter of fact, there is nothing new in this wide, wide world. There are reputed to be only thirty-six dramatic situations for stories, yet look at the huge number of new stories that come out in magazine and book form every year. For the most part, they are the old, familiar plots with new twists, dressed up in individualistic language, characteristic of the author.

The following Washington's Birthday display suggestions were actually arranged by public service companies in the cities that are mentioned. So far as your city is concerned, they are probably new ideas, which, of course, is the point that really matters.

Timely Slant to Heater Display

Mr. Lawrence Heiss, display manager, United Gas Improvement Company, Philadelphia, Pa., concentrated on portable gas heaters in his effective Washington's Birthday display. The semi-enclosed paneling around the sides and rear was decorated at intervals with a design of two crossed American flags, bunched together at the center with artificial cherry sprays and a small hatchet spread across them. This clever bouquet effect was finished off with a red satin ribbon rosette. There was an opening in the paneling at the center rear to permit room for a tall mound, draped with an American flag, and topped by a marble bust of George Washington, with ripe cherry sprays distributed on top of the mound and around the base of the bust. Grouped about the floor were nine different models of portable gas heaters, backed up by the following cards at the front sides:

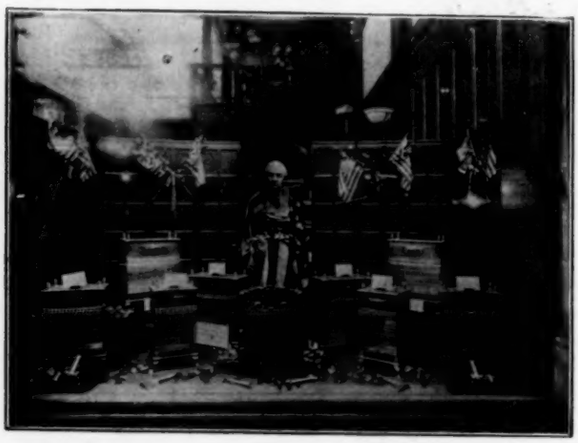
"Just the Thing for Cold Mornings
IS A GAS HEATING STOVE
Furnishes heat quickly and is economical to operate."

"COMPLETE COMFORT
is sometimes impossible because the room is a
trifle chilly. That's where a
GAS HEATING STOVE
would help quickly and cheaply."

Every heater bore a price card to show how inexpensive these heaters really were. The models on the floor at the extreme sides reposed on billows of red plush, with a hatchet and a few ripe cherry sprays in the front part of the plush pillows. Elsewhere the floor was bare, but was spruced up by "atmosphere" in the guise of small hatchets and ripe cherry sprays.

Cooking in Washington's Time

An interesting comparison between cooking methods of Washington's time and those of today was made in a window display by the Gas and Electric Company, Danbury, Conn. The center rear was occupied by a picture of George Washington on an easel, with a silk American flag draped across the top. The middle of the flag was gathered together at the top of the portrait, while the upper right and left ends of the flag were held up by wires from the ceiling. At the left rear corner was a wooden mantelpiece, topped with a pair of vases. A fireplace was simulated by red crepe paper, while the effect of



a lighted fire was convincingly produced by electric light bulbs, which were placed underneath the red crepe paper, topped with a few pieces of firewood. An old-fashioned iron pot was suspended by a chain over the fire. A row of bricks was spread across the fireplace opening, while a rug was laid across the hearth. The right rear corner was devoted to a modern gas range, with the following sign: "Cooking Today."

The modern way of cooking could have been easily elaborated upon, had there been two show windows available, by arranging the second effort as a modern white tiled kitchen, with gas stove, gas water heater, a sink of the right height (36 inches), a built-in wash tub, kitchen cabinet, aluminum kitchen pots and pans, and so forth. This phase should not have been skipped over so lightly, considering how that of Washington's time was handled with such a wealth of detail.

In the Days of Washington

The Vandervoort Company, Lansing, Mich., had a striking Washington's Birthday display, which was divided into two sections. The first section, captioned "In the Days of Washington," contained a large picture of George Washington against a background of flags. In the foreground was a collection of old dishes, yellow with age, in addition to a pewter tea set, a small geography book printed in 1815, and a glass flask with "Washington" blown in the side of it.

The section named "In the Days of 1923" contained a large picture of the late President Harding against a background of flags. The space in the foreground was taken up by a collection of modern household appliances, among them being gas irons, toasters and cooking dishes and pans. The marked contrast between the two periods undoubtedly made a deep impression upon those folks who viewed the window exhibition.

A Price Chopping Hatchet

If you are staging a price reduction on any line of gas appliances during February, here is an appropriate contribution from the Guarantee Electric Company, Battle Creek, Mich. Their display was draped with American flags and bunting. Hung at the middle was a large papier mache Old Glory shield, with a picture of George Washington in the heart of it. The shield was flanked by decorative lights. On the floor below stood the stump of a young cherry tree, with a business-like hatchet adhering to the said stump. A card served to point out that—

"We Cannot Tell a Lie—Our Prices Have Been Chopped Down." The severed limb of the cherry tree was laid near by the stump.

It goes without saying that each Washington's Birthday window display should carry a convincing salesmanship appeal, as otherwise the displays will be a dead loss from the standpoint of immediate business.

HOW TO USE GAS CORRECTLY

Samuel S. Wyer
Associate in Mineral Technology, U. S. Smithsonian Institute

1. Blue flame burners must be properly adjusted and burn blue only.
2. The inner cone of the blue flame must not strike any surface.
3. Solid tops on cook stoves should not be used; use grid or open tops only.
4. Top burners on cook stoves should be only 1¼ inches below the cooking vessel, and gas used at low pressures only.
5. Radiants in radiant fire heaters should never be operated so the radiants glow more than three-fourths of the distance from bottom to top.
6. The flame on "luminous-flame" heaters must not strike each other or any surface.
7. Incandescent mantels must not hiss or roar.
8. Flues should be used on all water heaters and room heaters used continuously.
9. Never use gas in any coal burning appliance; it will always be wasteful.
10. Water heaters should have enough heat absorbing surface to get the heat into the water and have the gas combustion products cool where they leave the heater.

DETERMINING COMBUSTION POWER OF COAL GAS

(Continued from page 139)

The two stopcocks are opened. The one attached to the T tube is opened full, while that of the bulb is only slightly open. The tubulated bottle is raised in such a manner that the flow of gas from the sample bulb is completed in three minutes, while at the same time a current of carbon dioxide is passed into the apparatus from the Kipp generator through the differential valve. The water, which has displaced the gas, finally fills the vertical part of the T tube. which brings the conditions back again as they were at the time the apparatus was first used. As it is possible to see all that transpires during the course of the analysis, the analyst is assured that no air is introduced into the apparatus. It may be added that in order to collect the small amount of water which is removed from the vertical branch of the T tube at the moment that the illuminating gas is introduced, the branch of the T tube is furnished with a small bulb to receive this water.

Combustion of the Gas

The combustion of the gas is carried out under very strictly controlled conditions. The rapidity of the flow of the current of gas is very carefully regulated so that no more than a bubble passes in every two seconds. The flow of gas is regarded as complete when the bubbles become microscopic in size. In order to avoid all mathematical calculations due to differences in temperature, the gas is made to pass from the nitrometer or azotometer—the little funnel which is connected to it at its upper part above the stopcock acts as a little water trough—into a very little tube, and from there into a micro-eudiometer, where it is measured over water at the same temperature that the volume of the original gas was measured before being filled into the sample bulb and analyzed. The entire time spent in the operation was approximately 35 minutes.

Analytical Results

The results that were obtained by this method of micro-analysis are given in the tabulation below, together with results obtained by the ordinary analytical methods:

STRASBOURG GAS

Volume of Gas in Cubic Centimeters	Volume of Nitrogen in Cubic Centimeters by Micro-Analysis	Per Cent	Per Cent by Ordinary Analysis
1.89	0.56	29.6	30.9
2.30	0.705	29.3	31.6
2.09	0.52	24.7	
2.04	0.58	28.3	
1.97	0.545	27.8 (1)	
2.06	0.57	27.65(1)	
	PARIS GAS		
2.105	0.212	10.1 (2)	12.9 (3)
2.265	0.215	9.5	12.9

(1) These are analyses on the same sample of gas.
(2) This figure is a little greater than the next one following, which gives the result of a second analysis of the same sample of gas. The discrepancy is undoubtedly due to some unburnt methane.
(3) The results obtained in the regular analytical method are always greater than those that are obtained by the micro-analytical process.

Discussion of Results

The results that were obtained by the micro-analytical method, even though they appeared to be perfectly accurate, were nevertheless carefully investigated, so as to determine whether or not there was any unburnt methane present in the residual gas, which was considered to be and measured as nitrogen only. It is a fact that it is a very difficult matter to burn methane with the aid of oxide of copper, and even when the gas mas made to pass through a column of oxide of copper, 30 centimeters in length, which was heated by two burners, it was found that a small amount of methane was present in the residual gas. The quantity varied between 0.01 cubic centimeter to 0.025 cubic centimeter. These amounts are so small that they do not have any appreciable effect on the accuracy of the analytical method and the errors which they cause in it may, therefore, be neglected.

Detonation Method

There is still another method which may be used in analyzing illuminating gas to determine its combustive power and that is by the detonation of a mixture of gas and oxygen in definite proportions. Known volume of oxygen and of the gas are mixed together, the oxygen being in excess and in the pure form, and then the mixture is detonated in a eudiometer. The carbon dioxide, which is produced by the detonation, is measured; the residual gases comprise oxygen and nitrogen. Hydrogen is added to this mixture and the mixture is detonated again and the excess oxygen that was left over from the first detonation is thereby determined. From these results both the percentage of nitrogen in the gas, as well as the combustive power, can be calculated without any difficulty.

Apparatus Used

Two gas generators are required, one for the generation of pure oxygen and the other for the generation of pure hydrogen. Kipp apparatus were found to be unsuitable for this purpose, as they are too cumbersome and would produce, even when operated most carefully, altogether too much gas than what is required in the analysis. Only a few cubic centimeters of oxygen and hydrogen are necessary for the analysis.

Hence, a flask, which has a large opening, was employed. The capacity of the flask should be about one liter. Water (for the preparation of oxygen) and dilute sulphuric acid holding in solution a small amount of copper sulphate (for the preparation of hydrogen) were introduced into the apparatus. A tube of large diameter, but contracted at its lower end and containing first a layer of fragments of glass

or glass balls, then a layer of oxylith (a preparation for generating oxygen) and then a layer of pure granulated zinc (for the preparation of hydrogen) was inserted in the center of the flask, extending right down into it. The flask was closed with a cork, which had one hole, through which there was inserted a straight tube, which was furnished with a stopcock and drawn out into a contracted portion at its upper end. This part of the tube, which was above the stopcock, was inserted into the center of a large flask, which acted as a pneumatic trough. The mouth of this flask was closed with a one-holed rubber stopper, through which the contracted portion of the tube, aforementioned, extended, allowing the gas to pass into the same. No air must be allowed to penetrate into this apparatus.

Advantages of Apparatus

The particular advantage of such an arrangement is that there is practically no unnecessary space in the apparatus. After the air has been driven out of the apparatus by allowing it to operate for a few moments, the gases that are evolved are absolutely pure, and furthermore they are generated always under the same pressure, which renders the reading of their volume an easy matter, involving no correctional calculations. When a few cubic centimeters of the gas are required for analysis, the stopcock is opened and the generator is started in operation. The gas may be collected over water in a suitable flask. After which the stopcock is closed and the apparatus is ready to function again, whenever necessary. The hydrogen and oxygen that are produced in this manner have been found to be 99.5 per cent pure by actual analysis.

The rest of the apparatus, the eudiometer tube and the ignition apparatus, are of the same character as employed in the first analytical process described above.

How the Analytical Results Were Obtained

An analysis was made of a sample of Strasbourg gas. The gas was freed of its carbon dioxide (2.9 per cent) and oxygen (3.1 per cent) contents, a total of 6 per cent in all. Nine cubic centimeters of the gas were used, which meant 9.5 cubic centimeters of the original gas ($9 \times 100 \div 94$). The mixture of gas plus oxygen was 18.95 cubic centimeters, which meant the addition of 9.95 cubic centimeters of oxygen. After explosion the volume of the gas was 7.9 cubic centimeters. The gases were then passed into a solution of cautsic potash to remove the carbon dioxide. The volume was reduced to 4.25 cubic centimeters. It was thus found that 3.65 cubic centimeters of carbon dioxide were absorbed, which meant 38.5 parts of carbon dioxide for every 100 parts of the gas burnt. Enough hydrogen was then added to bring the volume to 14.8 cubic centimeters. The mixture was detonated again. After explosion the volume was determined to be 9.05 cubic centimeters. This meant that the reduction in volume was 5.75 cubic centimeters. The excess oxygen was then calculated to be 1.92 cubic centimeters.

It was deducted from these figures that the quantity of oxygen consumed was 9.95 less 1.92, or 8.03 cubic centimeters. This means a consumption of 84.6 parts of oxygen for every 100 parts of the gas. The nitrogen in the gas was found by subtracting 1.92 from 4.25, which gives 2.33 cubic centimeters. There were, therefore, 24.5 parts of nitrogen for every 100 parts of gas. The final deduction from these figures is that the combustive power of the gas is 4.03.

Further Simplification of Process

The method can be still further simplified by just determining the nitrogen. In this case all that is required is to measure the original gas as it emerges from the pipes, detonate it with an excess of oxygen and absorb the carbonic acid gas that is produced by passing the gaseous products through a solution of caustic potash without measuring any volume except the residual volume of gas, comprising excess oxygen and nitrogen. This excess of oxygen is then determined by the addition of hydrogen in slight excess and the detonation of the mixture. A third of the reduced volume is the oxygen.

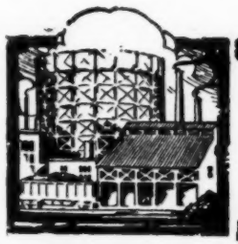
Conclusions

The determination of the "combustive power," a simple factor of illuminating gas, possessing real practical interest, defined as the volume of air that is required to effect complete combustion of the gas, may be easily and rapidly determined by means of an apparatus, consisting of a simple graduated bulb, in which the combustion of a given volume of the gas can be accomplished in the presence of a given volume of air or oxygen. This value varies around 380 to 400 for Strasbourg gas, around 450 for Paris gas.

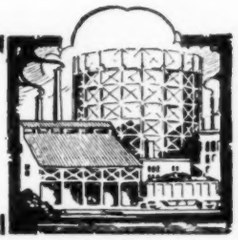
The determination of nitrogen, either by the micro-analytical method, or by indirect eudimetric method, is also simple and rapid. These methods are much preferable to the regular analytical methods, for the latter always gives results which are too high.

REMOVAL OF SULPHURETTED HYDROGEN FROM GAS BY LIME

When hydrogen sulphide is led rapidly in great dilution over lime the rate of interaction is slow at 100 to 200 deg., but it increases rapidly with rise of temperature to 600 deg., after which it is constant to 1,000 deg.; at 1,100 deg. a rapid decrease occurs. Lime has no action on coke-oven gas. In order to determine if the lime could be recovered by treatment with the waste gas from the regenerators of a battery of Martin ovens, a synthetic gas of corresponding composition was led over calcium sulphide. With rise in temperature desulphurization increased and formation of sulphate decreased. If the excess of oxygen in the waste gases is kept down, sulphate formation is diminished. The regeneration proceeds best at 1,000 to 1,050 deg.—(Chem. Zentialblatt, 1923, 94, IV., 896.)



NEWS OF THE GAS INDUSTRY



NEW ENGLAND GAS ENGINEERS MEET IN BOSTON

New Officers Elected—Large Attendance Listens to Prominent Speakers

The annual meeting of the New England Association of Gas Engineers was held in the Copley-Plaza Hotel at Boston, Mass., on Wednesday and Thursday, February 13 and 14, 1924.

A large attendance, more than 300 gas men, was at hand when President Paige opened the meeting, the fifty-fourth annual gathering of this old and influential gas association. The program of the two days of the convention was very extensive and included all phases of activities in which gas men are interested. It promised to keep the New Englanders busy during every minute of the time that they spent at the sessions. The program included a number of set addresses on technical, commercial and accounting matters, as well as talks by visitors on subjects of general interest. There was also a list of seven questions for general discussion, which is always a feature of the meetings of the New England Association.

President Paige Advocates Consolidation of New England Gas Associations

In his opening address, which will be published in full in the next issue of The American Gas Journal, together with a complete report of the meeting, as well as other papers read before it, President Paige advocated the consolidation of the various independent organizations of gas men in the New England States into a single organization, to be called the New England Gas Association.

Prominent Speakers Address Meeting

Among the speakers who addressed the meeting held Wednesday morning were H. J. Wells, of the Department of Public Utilities of Massachusetts; Samuel MacQuarrie, director of the New England Bureau of Public Utility Information; Sir Arthur Duckham of England, and Major Alexander Howard, secretary-manager of the American Gas Association.

New Officers Elected

The new officers of the New England Association of Gas Engineers, elected at the meeting, are as follows:

President—C. R. Prichard, vice-president and general manager Lowell Gas Light Company, Lowell, Mass.

First vice-president—H. N. Cheney, vice-president, Boston Consolidated Company, Boston, Mass.

Second vice-president—Frederick C. Freeman, engineer, Providence Gas Company, Providence, R. I.

Secretary-treasurer — John L. Tudbury, vice-president and treasurer, Salem Gas Light Company, Salem, Mass.

Directors

A. J. Smith, manager, Concord Light and Power Company, Concord, N. H.

G. Warren Stiles, superintendent, Portland Gas Light Company, Portland, Me.

A. H. Scott, superintendent, New Britain Gas Light Company, New Britain, Conn.

Francis Edward Drake, manager of gas depatrment, Lynn Gas and Electric Company, Lynn, Mass.

H. Vittinghoff, Stone & Webster Company, Boston, Mass.

65 Per Cent of Employees of Columbia Gas & Elec. Co. Stockholders in Company

Over 65 per cent of the employees of the Columbia Gas & Electric Company and its various operating subsidiaries, the Union Gas & Electric Company, the United Fuel Gas Company and others are now stockholders in the parent company, according to an announcement made in the second issue of "Hail Columbia," the new magazine whose publication has been undertaken by the Columbia company for the benefit of its employees, stockholders and customers.

The percentage of shareholders is even more impressive if only the permanent employees are taken into account, as nearly all the 35 per cent of non-shareholders are listed as unskilled, casual labor. Over 90 per cent of the permanent employees, and practically all of those who come in contact with customers and the general public are themselves active stockholders in the company they represent. In all, 36,500 shares of Columbia stock have been purchased by employees. It is believed that this constitutes a record for public utility companies.

The magazine also contains an article describing the customer-ownership campaign which its subsidiary, the Union Gas & Electric Company, is conducting in the Cincinnati ditsrict; "Where Loyalty is a Part of the Game," by E. Deu Pree, a dramatic story of a 48-hour fight of a repair crew, in a mountain snow storm, with a broken 20-inch gas main, caused by a landslide; an article on "What Regulation Means to the Utility," by S. B. Williams, editor of the Electrical Record; and other features.

J. Frank Stacey Called to Omaha to Testify in Holder Case

Mr. J. Frank Stacey, president and general manager of the Stacey Manufacturing Company of Cincinnati, is now visiting Omaha, Nebraska, where he has been called by the officials of the Metropolitan Utilities District to testify in the injunction proceedings brought against the city by certain property holders to prevent the building of the 4,000,000 cu. ft. capacity four-lift holder at its present location. The new holder is now in course of erection and Mr. Stacey expects to spend several weeks with his construction sueprintendent before returning to Cincinnati.

Wisconsin Utilities Association to Meet in April

The annual convention of the Wisconsin Utilities Association is to be held at the Hotel Pfister in Milwaukee, April 17 and 18. The general sessions are held in the forenoon, which will include, in addition to the president's address and reports of other officers and committees, the following speakers:

Halford Erickson, vice-president Byllesby Engineering and Management Corporation; W. S. Vivian, Middle West Utilities Company; Commissioner Adolf Kanneberg, Railroad Commission of Wisconsin; J. W. Hart, Elliot Service Company, etc.

Club luncheons will be held at noon each day. In the afternoons five parallel sessions will be held the gas, electric, electric railway, accounting and sales sections meeting separately during the afternoon. The gas section meetings include papers by:

Professor O. L. Kowalke, Mr. R. L. Rundorff of the University of Wisconsin; George H. Waring, consulting engineer, Grand Rapids, Michigan; N. T. Sellman, American Gas Association, etc.

A number of papers and addresses before the accounting and sales sections will also be of interest to gas men.

The annual dinner on April 18 at which time M. H. Aylesworth of the National Electric Light Association, and E. F. Wickwire, Ohio Brass Company, will be the principal speakers.

The officers of the association are: Harold L. Geisse, president; Bruno Rahn, treasurer; G. C. Neff, gas section, A. F. Davey, chairman; J. G. Felton, vice-chairman.

Gas Section Meeting

The annual meeting of the Gas Section of the Empire Gas and Electric Association will be held at the Arlington Hotel, Binghamton, N. Y., on Thursday, March 6 and Friday, March 7.

New features of the session will be the Question Box and separate round table discussions of their particular problems by the manufacture group, the distribution group and the industrial group.

At the various district meetings delegates have indicated that they would like to have the opportunity of anonymously submitting questions pertaining to their particular problems in writing, to be answered at the general session. The Question Box will afford this opportunity. Its success depends on the number and character of the inquiries submitted. Questions should be mailed to Mr. W. H. Earle, Rochester Gas and Electric Corporation. They should be sent in as long in advance of the meeting as possible, so that they may be referred to the proper men for answer.

The tentative program of the meeting is as follows:

First Sessoin

10 a. m., March 6, 1924

Question Box and Answers.

Resume of Progress: Each district chairman reporting the year's developments in his territory.

Appointment of Nominating Committee for 1924 officers.

Luncheon—12.30.

Second Session

2 p. m., March 6, 1924

1. Public Utilities and Their Public Relations: S. J. Magee, president, New York States Gas & Electric Corporation.

2. The Fuel Situation and Its Effects on the New York State Gas Industry: W. M. Carpenter, Empire State Gas and Electric Association.

3. The Back Run Method of Gas Manufacture: O. H. Smith, Consolidated Gas Company.

4. Cast Iron Pipe Joints: (Speaker to be announced).

5. The Use of Gas as Determined by the New Gas Demand Meter: H. C. Deffenbaugh, Rochester Gas and Electric Corporation.

6:30 p. m.—Dinner and entertainment features.

Third Session

10 a. m., March 7, 1924

1. Description and Discussion of the Checkerless Carbuertor on a Water Gas Machine: R. E. Kruger Rochester Gas and Electric Corporation.

2. Report of the Committee on Labor Saving Machinery: J. K. Crowell, Westchester Lighting Company.

3. Report of the Committee on House Heating: J. B. Allington Rochester Gas and Electric Corporation.

Luncheon — 12:30 (in their groups):

A. Manufacturing Group—Leader (to be selected). Topics—Automatic Water Gas Control; Holding Heating Problems.

B. Distribution Group—Leader —Joseph Lucena, Syracuse Lighting Company. Topic—Standardization of Distribution Practice in New York State.

C. Industrial Group—Leader (to be selected). Topics—Wholesale Baking with Gas, and others to be announced.

Southern Gas Association to Hold Executive Board Meeting

The Southern Gas Association will hold an executive board meetinging as usual in mid-winter at Washington, D. C., on February 20, to consider several important matters in connection with the association's work, as also determining on the program for the 1924 convention, to be held in Augusta, April 22 to 24.

The board of directors is composed of R. J. Hole, Greensboro, N. C.; S. E. Linton, Nashville, Tenn.; J. Y. Cheney, Orlando, Fla.; A. M. Wolfe, Baltimore, Md.; C. Riddleberger, Staunton, Va.; I. Rawson St. Louis, Mo.; S. W. Brown, Florence, S. C.; S. Cooper, Charleston, S. C.; A. D. Whittaker, Atlanta, Ga.; G. H. Smith, Norfolk, Va., and secretary, Edward D. Brewer, Atlanta, Ga. A full attendance is expected.

New Automatic Water Heater

The Goodman Automatic Gas Water Heater is a new water heater recently placed on the market by the Goodman Automatic Water Heater Co., Inc., 523 Atlantic avenue., Brooklyn, N. Y.

Some of the improvements are as follows: Goodman improved base, a part of the tank itself, which makes a solid base; improved bottom with drain at lowest point so that tank can be flushed clean. The tank is covered with a layer of hair felt one inch thick to retain the heat. All water pipings and fittings are solid brass. It is equipped with a magnetic thermostat, adjustable to 40 degrees in either direction. The tank is made of 12 in. gauge steel and has a capacity of 36 gallons.

An unconditional guarantee for one year goes with every heater.

Illustrated booklet showing sectional view of heater with specifications will be mailed on request.

Reinforced Refractory Tile

The manufacture of reinforced refractory tile, using crushed old fire brick as an aggregate and Hytempite as a bonding material, is being successfully carried on by a number of industrial and power plants.

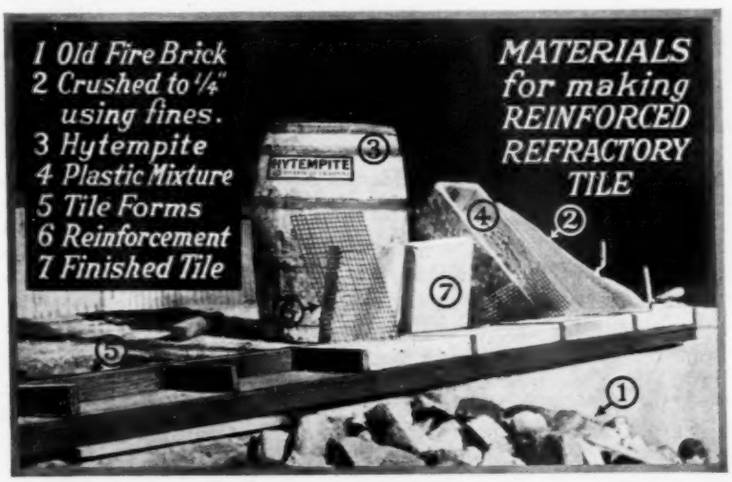
Baffle tile of this type have recently been made and put in service by the Putnam Lumber Company of Jacksonville, Fla., in one of their power plants. The accompanying photograph shows the simple method used for making such tile.

The old fire brick (using bats and broken brick) are first crushed so that all material will pass ¼ in. mesh, using the fines. Hytempite is then diluted in a mortar box to the consistency of a pancake batter and the crushed fire brick added gradually and mixed well so as to be free from lumps. Enough crushed brick is used so that the material will have about the consistency of moulding sand, being slightly plastic. The approximate quantities used are 80 pounds of crushed fire brick to each 40 pounds of Hytempite.

The material when mixed should show no free moisture when squeezed in the hand, but should yet be moist enough to cling together.

The form used for tile making consists of two-inch plank of the desired width for the bottom. Short strips for cross sections are spaced at the proper distance and side strips of inch material of the desired height run the full length of the bottom section and are securely nailed to the base. The plastic mixture is then placed in the form to a depth of approximately half the desired thickness of the tile. This is levelled off and the wire reinforcement laid in place for each tile. The plastic mixture is then laid over the wire mesh to fill the form. Each tile is then thoroughly tamped, using a wood block of appropriate size. The tamping head of the block is covered with burlap to prevent the material from sticking to it.

Tile of this type were made under the direction of O. J. Parish, chief engineer of the Putnam Lumber Company, and are in use in the Rust boilers at one of their plants.



General Gas Light Co. Wins Patent Suit Decision

Judge Sater, District Judge of the United States District Court of Ohio Eastern District, has rendered the following decision in the General Gas Light Company, Kalamazoo, Mich., against the J. H. Grayson Manufacturing Co., of Athens, Ohio:

"At the hearing of these cases a rather distinct impression was left on my mind that the defendant's device infringes. Further consideration confirms the opinion then entertained. The patents referred to in the file wrapper, as stated by the witness, Ray (p. 104), show older structures and cannot be considered as anticipations of the present structures. They merely show the state of the art as it existed in early days. I do not think the plaintiff's patent was anticipated by any of American issue. Catalogues and British patents, viewed along with those issued in this country, show a crowded art and a comparatively narrow field for invention. None of the British patents was taken out in this country. Defendant's counsel, when the opening statement of the cases was made (p. 8), in speaking of the British patents, stated: "We are not relying on prior public use in this country." The question as to prior uses may therefore be laid aside. The limitation put upon the evidential value of English patents which have not been taken out also in this country, and of publications, catalogues, scientific works, journals, and the like, is well understood. Without entering into an analysis of the several structures, patents, other publications and other evidence admitted, I am of the opinion the Humphrey patents were not anticipated and involve invention. The use of sheet iron instead of some other metal is not consequential. The patented devices are rather unique in their unitary structure and arrangement of parts, are useful, have been a decided commercial success, are sufficiently unlike any preceding structure to class them as novel, and betray the exercise of the creative faculty. I am constrained to hold them valid and infringed, and a decree may go accordingly in each case."

Tying Up Advertising to Current Events

Speaking of tying up advertising to current events, your correspondent noted while he was in Portland, Oregon, the other day that in a program of a local theatre where May Robson was billed in the "Rejuvenation of Aunt Mary," there was an illustration of Miss Robson at her gas range. The cut torn from the program is here shown:

MAY ROBSON at HOME
Bayside, Long Island

This favorite actress is here shown in her kitchen, where she has all the latest improvements. Notice her white-enameled gas range with Ovenheat Control, just like the Gas Company sells here in Portland. Have you seen the beautiful display rooms on the lower floor of the Gasco Building, Fifth and Alder?

New Contracts Awarded

The Stacey Manufacturing Company of Cincinnati have recently closed contracts for the erection of four 1,000,000 cu. ft. capacity three-lift holders for Beverly, Mass. Hamilton, Ontario, Canada, Ashtabula, Ohio, and New London, Conn. There are also two large purifiers included in the New London contract.

Pawtucket to Erect New Holder

The Pawtucket Gas Company has awarded a contract to Stone & Webster, Inc., of Boston, Mass., to lay the foundation and supervise the erection of a 3,000,000 cu. ft. gas holder at its Tidewater Street plant in Pawtucket, R. I. The holder will be supplied by the Bartlett-Hayward Company.

New Company Organizes

The Reeves Manufacturing Company of Milford, Conn., have sold the manufacturing and distribution rights of the Reeves Gas-Air Pre-Mixer to the Industrial Gas Equipment Company of New Haven, Conn.

The demand for the Reeves apparatus has steadily increased until it became impossible for the former owners to handle the volume of manufacturing and the details of distribution.

The newly-organized company is equipped to handle the increasing burden of manufacture of this equipment, as well as various other industrial gas burning apparatus. Sales and service representatives will be stationed in the larger cities, insuring immediate attention to all inquiries.

Charles A. Drum, industrial gas engineer, who has been associated with the Reeves Manufacturing Company and actively interested in the development of the market for the Reeves apparatus, has become affiliated with the new organization.

Blesch in Charge Cleveland Office Combustion Utilities

The Cleveland office of the Combustion Utilities Corporation is now in charge of Mr. Charles Blesch, who will direct the activities of the company in the northern Ohio territory.

Mr. Blesch has had a great deal of experience in the utilization of fuel in industry, having spent a considerable time with the Lorraine plant of the National Tube Company. Mr. Blesch is a mechanical engineer, a graduate of the Carnegie Institute of Technology.

The Combustion Utilities Corporation are laying plans for a very active campaign in the Ohio territory on their industrial furnaces. Their steel plant work is already under way and plans for the year include increased effort in the ceramic and related industries.

The Cleveland office of the Combustion Utilities Corporation, of which Mr. Blesch will have charge, is at 837 Guardian avenue.

Panama Canal Purchases 1,000 Gas Stoves for Zone Employees

Circular No. 627-36, issued by the Panama Canal, contains the interesting announcement that they have purchased from the Panama-Colon Gas Company one thousand gas ranges, which will be installed in the quarters of any employee of the Panama Canal or Panama Railroad who desires to be relieved of the drudgery of coal and fire-wood upon the payment of a small, nominal fee, to cover the cost of the removal of the old coal stove.

That this announcement will bring joy to both housewives as well as servants goes without saying, as they will now be able to avail themselves of a fuel which, because of its cleanliness and convenience, lends itself particularly to a tropical climate, where a cool sanitary kitchen is most essential.

S. P. Vecker, vice-president of the Panama-Colon Gas Company, when interviewed regarding Circular No. 627-36, stated that sufficient six-inch cast iron pipe had been purchased from the Panama Canal to permit the construction gangs to begin work immediately on the installation of the gas mains, and that orders for additional pipe, fittings and kindred accessories had been placed by cable. The company now has a gang of men staking out their proposed gas lines, and the installation of gas mains will begin on Balboa road at that point where the company's 6-inch line branches off to Quarry's Heights Military reservation. In order that the entire work may be carried out within the shortest possible time the company proposes to put several hundred men to work in making the necessary installations, and as is the usual practice of the company, preference in both skilled and unskilled labor will be given to Panamanian workmen.

Mr. Vecker further stated that he feels that this purchase of gas ranges practically makes gas the official fuel of the Zone, and that this decision has only come after an exhaustive series of tests, extending over a period of two years which resulted in bringing out forcibly the economy of gas, both in money and in labor, as shown by the following interesting figures: In the district of Ancon, where the trial tests were conducted, the average monthly cost of gas, extending over a period of nineteen months, has been $5.13, while in the district of New Cristobal the average monthly cost had been $4.26 per consumer.

Questioned as to how the consumption of gas in Ancon and New Cristobal compared with the consumption of gas in the cities of Panama and Colon, Mr. Vecker stated that the comparison was most favorable, as during the first nine months of this year the average monthly gas consumption in the city of Panama was $5.89, and in Colon $4.72 per consumer.

This purchase of one thousand gas stoves by the Panama Canal for the use of their employees will undoubtedly be highly pleasing to the people of Panama, who have watched with considerable interest the dogged determination which this enterprise has displayed since its conception in 1917.

Albany Gas Holder Case

Albany, N. Y.—The Albany Gas Holder case, which attracted nation-wide attention, in which the city of Albany sought through a municipal ordinance to prevent the Municipal Gas Company supplying such city with gas from erecting an additional gas holder, resulting in consequent litigation, has been decided by the Appellate Division of the Supreme Court in favor of the company, and the gas holder is now in process of erection.

At last report the city of Albany had appealed from the order made by Mr. Justice Joseph Rosch of the Supreme Court directing that a peremptory mandamus issue to the superintendent of buildings of the city of Albany to compel him to receive the plans for a gas holder to be erected by Municipal Gas Company and if the plans conformed to the building code of such ctiy, to issue a permit for its construction. The appeal of the city of Albany was argued at the November term of the Appellate Division of the Supreme Court in Albany and in January the Appellate Division by unanimous verdict confirmed the order of Justice Rosch. After the decision a writ of mandamus was issued to the superintendent of buildings, who granted a permit for the erection of the holder at once. The opinion of the Appellate Division having been unanimous, further appeal to the Court of Appeals cannot be taken.

The particular significance attached to the case was embraced in the power of a city to enact an ordinance preventing a public service corporation from furnishing its customers with the service the state law makes mandatory must be supplied and in turn penalizes the corporation failing so to do. The decision of the court will tend to check the passage of tantalizing ordinances.

"Thinking of Tomorrow" Booklet Distributed in Thrift Campaign

Chicago, Ill.—Scores of letters and telegrams have been received at the general offices of the Illinois Power and Light Corporation here complimenting the company on its thrift campaign, which started in January, and is to continue throughout the year.

Thousands of dollars are being spent in the Central States by the corporation advertising the big utility's slogan, "Make This Your Thrift Year."

Principal among the congratulatory letters received is one from John A. Goodell, secretary of the National Thrift Committee of the Y. M. C. A., sponsoring a national thrift movement this year, who says in part:

"One of the 10 points in our creed is, 'invest in safe securities.'

"We have never emphasized this feature very much because of many difficulties that it might develop. About a year ago my attention was attracted to the customer and employee ownership movement by corporations affiliated with the National Electric Light Association. It is the first movement that has come to my attention that I have felt we might co-operate with."

Numerous other communications have been received from various agencies backing the thrift idea, and public service information bureaus, commending the power company for its activity.

One of the features of the big campaign is a new booklet, just off the press, compiled by the company and entitled "Thinking of Tomorrow," which is being distributed free, and intended as a help to those who want to save money and be thrifty.

Current Market Prices

COALS (By Courtesy of Coal Age)

A. Bituminous.

(Spot prices, F. O. B., mines, net tons).

High Volatile, Eastern	Market	Price
Pool 54-64 (Gas Standard))	New York	$1.50 to $1.75
Pittsburgh screened gas	Pittsburgh	2.50 to 2.65
Pittsburgh gas, mine run	Pittsburgh	2.25 to 2.35
Kanawha lump	Columbus	2.50 to 2.75
Kanawha mine run	Columbus	1.50 to 1.75
West Virginia lump	Cincinnati	2.75 to 3.00
W. Virginia gas mine run	Cincinnati	1.65 to 1.85
Midwest		
Indiana 4th vein lump	Chicago	3.00 to 3.25
Indiana 4th vein mine run	Chicago	2.50 to 2.75
South and Southwest		
Big Seam lump	Birmingham	3.75 to 4.00
Big Seam mine run	Birmingham	1.75 to 1.85
Southeast Kentucky lump	Louisville	3.00 to 3.50
Southeast Kentucky mine run	Louisville	1.65 to 2.00

B. Anthracite.

(Spot prices F. O. B. mines, gross tons),

	Market	Freight rates	Independent	Company
Egg	New York	$2.34	$8.50 to $9.25	$8.75 to $9.25
Egg	Philadelphia	2.39	8.50 to 10.00	8.75 to 9.25
Egg	Chicago (net tons)	5.06	7.50 to 8.80	8.00 to 8.35

COKE (By Courtesy of Iron Trade Review).

Connellsville, furnace	$3.75 to $4.25
Wise County, furnace	4.50 to 5.75
Alabama, furnace	5.25 to 6.25
Foundry, Newark, N. J., del.	10.91
Foundry, Chicago, ovens	12.50
Foundry, Boston, delivered	12.50
Foundry, St. Louis	12.50
Foundry, Granite City, Ill.	12.50
Foundry, Alabama	5.00 to. 6.50

PETROLEUM (By Courtesy of Oil, Paint & Drug Reporter)

(Prices at wells, per bbl.)

Pennsylvania—Ohio—West Virginia.	
Cabell, West Virginia	$2.05
Corning, Ohio	1.80
Lima	1.13
Pennsylvania	4.00 to 4.50
Wooster, Ohio	2.00
Indiana—Illinois.	
Illinois	1.92
Indiana	1.93
Oklahoma—Kansas.	
Healdton	.90
Mid-continent (low gravity)	1.00
Gulf Coast.	
Gulf Coast, Grade A	$1.65
Gulf Coast, Grade B	1.40
Pierce Junction	.65

GAS OILS.

Gas Oil, Bayonne, bulk gal.	5½c
Gas Oil (32-36) Illinois-Indiana, gal.	3¾ to 4 c
Gas Oil (32-36) Oklahoma, gal.	3¾ to 4 c
Gas Oil (32-36) Gulf Coast, gal.	4½ to 5 c

PIPE AND FITTINGS—CAST IRON GAS PIPE.

(By Courtesy Iron Trade Review.)

Four-inch, Chicago	$66.20 to $67.20
Six-inch and over, Chicago	62.20 to 63.20
Four-inch, Birmingham	56.00 to 57.00
Six-inch and over, Birmingham	52.00 to 53.00
Four-inch, New York	70.60 to 71.60
Six-inch and over, New York	65.60 to 66.60
Standard fittings, Birmingham, base	115.00

6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20.

BY-PRODUCTS

(By Courtesy of Oil, Paint and Drug Reporter)

Ammonia aqua, 16 deg. drums lb.	5 to 5½c
Ammonia aqua, 20 deg. drums lb.	6¼ to 7 c
Ammonia aqua, 26 deg. drums lb.	7 to 7½c
Ammonia squa, anhydrous cylinder, lb.	30 to 36 c
Ammonium sulphate, bulk F. O. B. Works, per 100 lbs.	$2.90 to $3.00
Potash prussiate, yellow casks, lb.	20 to 21 c
Potash prussiate, red casks, lb.	45 to 48 c
Soda prussiate, yellow casks, lb.	13 to 13½c
Soda sulphocyanide, barrels, lb.	45 to 55 c

COAL TAR BASIC PRODUCTS.

(By Courtesy of Oil, Paint and Drug Reporter)

Benzol C. P. tanks, works, gal.	25 to 30c
Benzol, drums, gal.	30 to 35c
Benzol, 90% tanks, works, gal.	23 to 28c
Benzol, 90% drums, gal.	28 to 33c
Napthalene, flake, barrels, lb.	6¼ to 7c
Napthalene, crushed bags, lb.	5½ to 6c
Solvent Naphtha, water white works, gal.	28c
Solvent Naphtha, drums, works, gal.	33c
Solvent Naptha, Crude Tanks, works, gal.	25c
Solvent Naphtha, drums, works, gal.	30c
Toluene, C. P. tanks, works, gal.	31c
Toluene C. P. drums, works, gal.	36c

The upward movement in the price of petroleum at the well continues, to the jubilation of the producers. Production is steadily increasing and a comparatively large number of wells are being brought in. The price movement seems to be spread all over the continent and the signs are for a rising market for some time to come. The prices of petroleum products have risen in corresponding proportion and gas oil prices are generally higher everywhere. The demand for this product is controlled by contracts and the market reports indicate nothing untoward in that direction.

The long expected rise in coal tar basic products materialized last week and a considerable rise in prices of benzol, solvent naphtha, etc., is noticed. The present prices are now about what prevailed during most of last year.